MUSIC AND ARCHITECTURE

Reflections on the new Berlin Philharmonie

Prof. Ing. Fritz Winckel

We have had concert halls for only 200 years. As far as serious music is concerned, its place in the Middle Ages was in the church; with the growing secularization it moved to the palaces; and in the Baroque period, to the courts of princes.

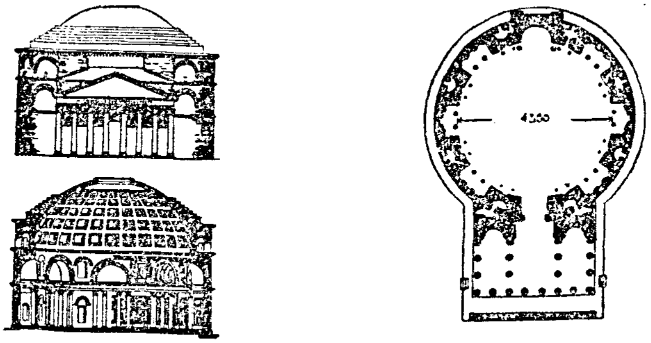
With the establishing of concert halls the habit of passive listening came in for the first time. In early days musical life was mostly limited to "self-music" — the singing and playing of instruments for one's own pleasure. The viewing of works of art again, in organised collections as a passive affair is only 200 years old. The British Museum was founded in 1759; the first concert hall was opened in Hamburg, Germany, in the year 1761 through the initiative of the citizens, who organised themselves in the form of a concert society. Soon afterwards the concert hall of Leipzig Gewandhaus was built in a similar way by the reconstruction of a Tuchhaus (Guildhouse) which is not to be confused with the Gewandhaus newly built in the year 1886. Thereby, the foundation for the development of the great orchestras on the one hand, and the development of the great symphonic form on the other, was laid.

What conceptions did one have in that initial stage for the construction of a concert hall ? For model one could reach back to the theatre buildings, which were also used for opera performances and occasionally for concerts. Thus the rectangular ground-plan, with the stage on the smaller side of the rectangle came into being as the standard design. Intrinsically, this architectural type of concert hall has been conserved up to the present times. All the best concert halls of the world, which the author has studied and first written about during the year 1955, belong to this rectangular type.

Translated from the German by Dr Heimo Rau

	Year of construction	*No. of seats*	*Reverberation time (in seconds)*
Old Philharmonie, Berlin/Germany	1888	1,960	1.9
Gewandhaus, Leipzig[1]/Germany	1886	1,560	?
Music Association Hall, Vienna/Austria	1870	1,950	2.0
Concertgebouw, Amsterdam/Netherlands	1887	2,200	2.1
St. Andrew, Glasgow[2]/Scotland	1877	2,500	1.9
Symphony Hall, Boston/U.S.A	1900	2,630	1.8

In the above list it is especially noticeable that five of the six edifices came into existence within the short period from 1870 to 1888. In the case of the Symphony Hall in Boston, it is to be borne in mind that the advisory acoustics expert, the American, Sabine, had gone in for thorough preliminary studies in Leipzig and had proposed the Gewandhaus as a model for the building-project in Boston—the so-called Leipzing style, so that this Hall too, is to be attributed to that earlier style period, which can be termed neo-classic. (See Fig. 1) Most of these buildings from outside are comparable to the ancient Greek Parthenon, and look like temples with their columns, whereby stress is laid on the devotional character of music which, since Beethoven, became the approach to music for the community of concert-goers. What has constituted the outstanding acoustics of those places of performances, was the organisation of the ceiling and the walls, through decorations on both, in



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[1] destroyed in war

[2] destroyed through fire, 1962

the form of reliefs, decorative projections, balustrades, caryatides, the organ screen, large crystal glass chandeliers, *Kassetten* etc. All these added up to give the hall an uniform distribution of sound and the required reverberation time. It must, however, be emphasized that most of these high-quality concert halls have only a minimum of wood-panelling though we should have no doubts as to the positive advantages of wood panels in acoustic treatment. A reverberation time of approximately two seconds has proved to be the optimum for symphonic music of the 18th and 19th century.

When the reverberation time and the diffusion of sound are perfect, "symphonic sound" is heard in all its roundness, without destroying its structure as a whole. This fusion, this symphonic blend, is essential for the expression of music from Beethoven to the late Romantics.

Relationship of Space and Sound

On the other hand an entirely different development of concert hall has evolved, which is manifest for the first time in Salle Pleyel built in Paris, in 1927. Here the ceiling slants towards the stage parabolically, in order to project the sound to the listener by the shortest route. In this case the sound pattern maintains its *praesenz,* as the technicians would put it i.e. the musical structure remains transparent, lively and helps polyphonic hearing. But the roundness of symphonic sound is withdrawn and Salle Pleyel achieves clarity at the expense of "blending". In spite of this lack a way was shown here which conformed more to the character of new music. Thus followed a whole series of concert halls with parabolic ceiling shapes. The Festival Hall in London (1961) must be mentioned as a prototype of this. The required definition of sound in such halls, demands from the orchestra the highest quality of performance. This type of Hall exposes all the limitations of a performance. The hall of the Academy of Music, Berlin with its strikingly curved ceiling, belongs to this same type. Further, typical examples are : Turku in Finland, the Festival Performance House in Salzburg, the Philharmonic Hall in Liverpool and the great Studio of Radio, Copenhagen.

Development of Central-Oriented Buildings

In addition to these forms of architecture of the *langsschiff* (longitudinal nave) of the rectangular ground-plan, analagous to the Cathedrals of the Middle Ages, the idea of circular construction was already predominant in antiquity. In the development from the open-air Greek to the Roman theatre it went further in Christian times to the closed construc-

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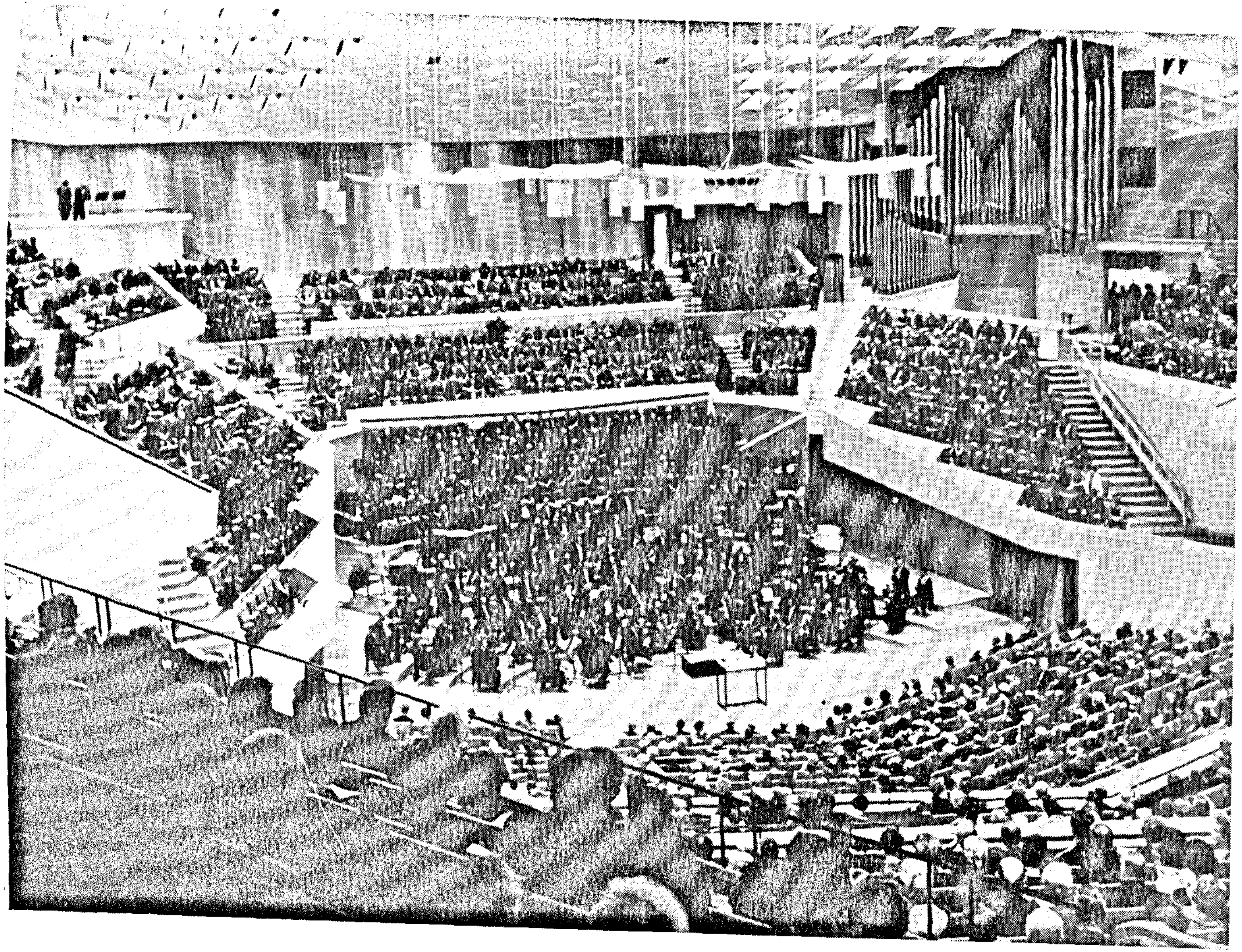
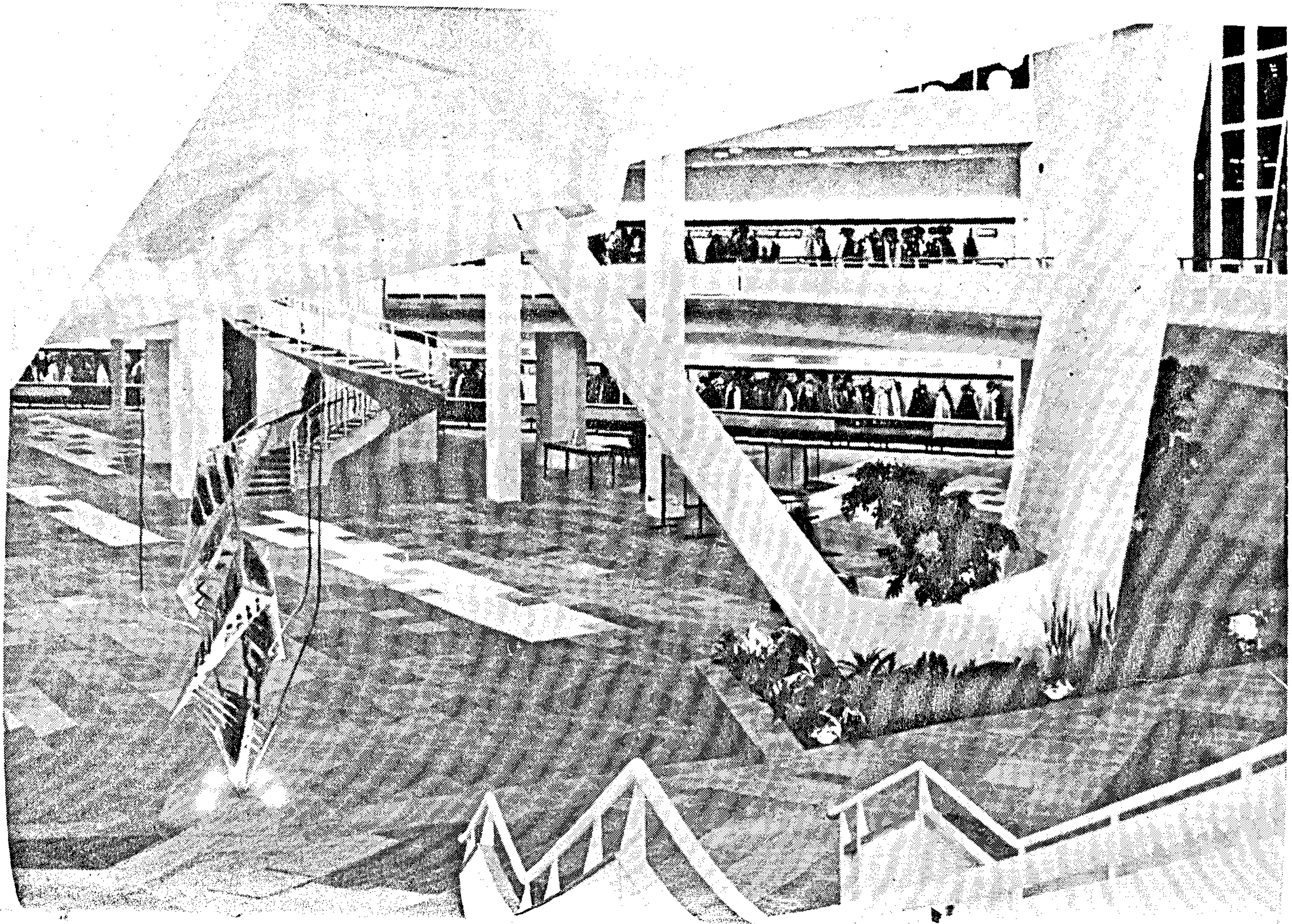
Opposite : Berlin Philharmonie Auditorium





tions, which are roofed over with a dome. (See Fig 2). Prototypes such as the Hagia Sophia in Constantinople (537 A.D.), San Marco in Venice, examples in the Byzantine epoch as also in Islam, continued through all the centuries up to the present day. In all this there has been a desire to concentrate the audience or participants around the central focus of activity so as to achieve the most effective communication.

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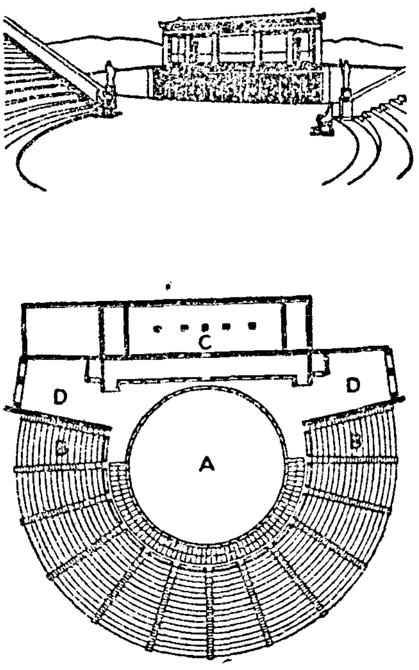
Open-air Theatre



A Orchestra
B Auditorium
C Stage
D Entrance for Chorus

Unfortunately the dome is the most disadvantageous form for a uniform distribution of sound in the room, since a concave surface has a tendency, like an optical lens, to concentrate the sound at one point instead of diffusing it. This effect is, of course, mitigated in the case of somewhat "flattened" domes, but in principle the best acoustics cannot be attained. In our times the architecture of the vaulted shells, which come down to the floor, have come into being in Boston (Kresge Hall M. I. T.) and in Frankurt Hoechst (Jahrhunderthalle) as a form of construction (Bauform), where the dome inside has been cut out through an intermediate flat ceiling to avoid the detrimental concave acoustical influence. Also in modern churches one reverts frequently to this type of circular construction with the altar erected in the centre.

It seemed like the "egg of Columbus", when Hans Scharoun the famous German architect in his first design (Entwurf) for the Philharmonie proposed a convex surface for the roof, like the ceiling of a tent. A convex surface helps to scatter the sound and thus a system for the uniform distribution of sound in the hall is achieved. Curved or circular walls have the danger of concentrating sound in one spot. Scharoun counteracts this through a ground plan in the form of a polygon. In keeping with the spirit of modern architecture, his polygon is a somewhat symmetrical pentagon (See Fig. 3).

Opposite: Berlin Philharmonie, Foyer

From an acoustical point of view these fundamental thoughts for a new form of central structure have proved correct in the edifice of the new Philharmonie, whereby a fundamentally creative contribution for international discussions concerning the best form for concert halls has been achieved. Fundamental thought means music as the determining factor "in the centre of the room", as Scharoun stated in the explanation to his design, and von Karajan — Conductor of the Berlin Philharmonie Orchestra — explained exhaustively in a note submitted in conjunction with the author as acoustics expert — to the judging Committee in the year 1956. It is no secret that the construction was a bold venture since, for this new style there existed no models. All these factors, which effect "hearing conditions" for listeners cannot be rationally calculated in advance by the designer or the acoustics expert.

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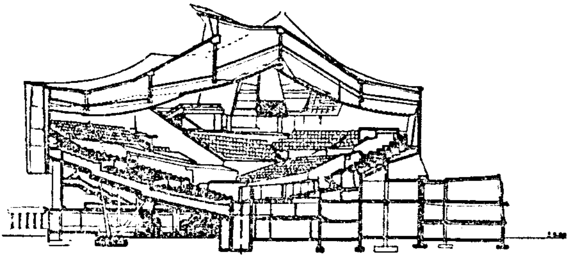

One should bear in mind that those who sit in the seats in front of the orchestra feel as they would feel if they were sitting in a classical concert hall. The orchestra is enclosed on three sides and there is therefore no difficulty in the orchestra receiving enough reflection from the walls to hear one another. The seats behind the orchestra and on the sides are provided for, at such a height that the full sound of all the instruments can be heard as fairly balanced at that distance, and the homogenity of sound necessary for a classical symphony can be achieved. But we must remember that in the earlier concert halls too, the balconies were arranged all around the orchestra as in the Gewandhaus for example, or at least on both sides of the orchestra, as in the Music Association Hall, Vienna. Seats near the rostrum have always been very popular.

The first performances in the Philharmonie have already proved that one can achieve both good blending of sound and clarity to a fair degree, and thus combine the good qualities of both types of earlier concert halls. Thereby one can do justice not only to the old but also to the new music.

It is a coincidence that simultaneously with the Philharmonie, the Philharmonie Hall in Lincoln Centre, New York, has been built in the classical rectangular form. The brick-work of both the buildings were completed in the autumn of 1961. Thus alongside the central structure, the longitudinal construction stands again for discussion just as since the pre-Christian era, the longitudinal nave of the basilica with the Byzantine dome-construction has led to a discussion which has never come to an end and in fact is now starting all over again.

It is up to us now in the Philharmonie, to learn by experience and to use all the available technical possibilities of the hall to achieve, through fine tuning and adjustment, the ideal balance for musical-acoustics.

Prof. Ing. Fritz Winckel, an Austrian by birth, took up academic teaching at the Technical University of Berlin in 1951, where he is still lecturing in the capacity of Professor. He is considered an expert on acoustics and electro-acoustics and has, in particular, worked out a survey of all the important concert halls of the world.